

REMARKS

In accordance with the foregoing, claims 1, 2, and 5-7 are amended and new claims 8-11 are presented. No new matter is presented in any of the foregoing and, accordingly, approval and entry of the amended claims are respectfully requested.

Claims 1-11 are pending and under consideration.

In the Office Action mailed May 10, 2004, claims 1, 3, 6, and 7 are rejected under 35 U.S.C. §103(a) as being unpatentable over Barry (U.S.P. 6,433,903) in view of Ogawa (U.S.P. 6,256,126); claims 2 and 5 are rejected under 35 U.S.C. §103(a) as being unpatentable over Barry in view of Ogawa and Choi (U.S.P. 6,271,962); and claim 4 is rejected under 35 U.S.C. §103(a) over Barry in view of Ogawa and Ishimatsu (U.S. Patent No. 6,018,406).

The foregoing rejections are respectfully traversed.

According to aspects of the present invention, a communication system performs WDM optical communications efficiently with variably set supervisory control channels. According to an aspect of the present invention, a WDM device 10 variably sets supervisory control channels for WDM transmission, and a network managing device indicates setting information of the supervisory control channels and manages an operating state of the network. Thus, the communication system is capable of adaptively setting supervisory control channels and is flexible and efficient.

According to aspects of the present invention, the WDM device variably sets supervisory control channels that include a first optical supervisory channel whose transmission band falls outside of a transmission band for main optical signals and a second supervisory channel whose transmission band falls within an idle band in the transmission band for main optical signals. A network managing device indicates setting information of the supervisory control channels and manages an operating state of the network.

Barry teaches (cols. 2-3, starting at line 59) a wavelength-division multiplexed (WDM) system that uses an in-fiber, in-band optical management channel (OMC) including an optical communications link having cascaded optical amplifiers. Barry teaches that each optical amplifier has a pass band, throughout which the amplifier provides substantially a predetermined optical gain, so that each amplifier passes optical signals in the pass band along the optical communications link without interception.

Ogawa teaches (col. 1, starting at line 6) a narrow band wavelength division multiplexed optical communication system (a NB-WDM system) in which the output power of an optical amplifier is controlled based on the number of wavelengths of optical signals.

Choi teaches (cols. 1-2, starting at line 51) a NB-WDM system in which the output power of optical amplifier is controlled based on the number of wavelengths of optical signals.

Ishimatsu teaches (cols. 2-3, starting at line 60) optical repeaters installed between terminals that form a multiplexed optical signal by multiplexing component rays of mutually different wavelengths and collect information for supervision of a transmission of the multiplexed optical signal.

The combination of Barry and Ogawa teaches a WDM system that uses an in-fiber, in-band OMC including an optical communications link having cascaded optical amplifiers that each have a pass band, throughout which the amplifier provides optical gain, so that each amplifier passes optical signals in the pass band without interception, and in which the output power of an optical amplifier is controlled based on the number of wavelengths of optical signals.

The combination of Barry, Ogawa, and Choi teaches a WDM system that uses an in-fiber, in-band OMC having optical amplifiers that each have a pass band, throughout which the amplifier provides an optical gain and passes optical signals along the optical communications link without interception, and the output power of an optical amplifier is controlled based on the number of wavelengths of optical signals.

The combination of Barry, Ogawa, and Ishimatsu teaches a WDM system that uses an OMC including an optical communications link having cascaded optical amplifiers that provides a predetermined optical gain and passes optical signals without interception, and in which the output power is controlled based on the number of wavelengths of optical signals, and includes repeaters and terminals that form a multiplexed optical signal for supervision of a transmission of the multiplexed optical signal.

TRAVERSE OF REJECTION OF INDEPENDENT CLAIM 1 (AND DEPENDENT CLAIMS 2-5)

Independent claim 1, as amended, recites that "variable setting" includes "selection of an idle-band wavelength for the second supervisory channel," and that "setting information" includes "wavelength information that specifies which idle-band wavelength to select for use as the second optical supervisory channel at the supervisory control channel setting means." The feature of setting information was deleted from dependent claim 2, and included in independent claim 1.

The Action concedes, in discussion of the above feature, that neither Barry, Ogawa, or the combination of the two teaches:

that the setting information indicating means uses one of wavelength information, section information, or time information as the setting information for setting the second supervisory control channel. Though Ogawa teaches using wavelength information as the setting information, the setting information has no effect on the wavelength of the supervisory signal. Furthermore, Barry specifically teaches that the wavelengths of the two supervisory control channels are strictly controlled. . . thereby teaching away from adjusting the wavelength of the supervisory signal as claimed." (Emphasis added).

(Action at pages 6-7).

That is, the Action concedes that the cited art, does not teach or suggest, alone or in combination features recited in independent claim 1, as amended.

Further, dependent claims 2-5 recite features that patentably distinguish over the cited art on their own. For example, dependent claim 3 recites a communication system "wherein said supervisory control channel setting means comprises means for using said first optical supervisory channel for indicating said setting information between WDM devices and using at least one of said first optical supervisory channel and said second optical supervisory channel for transmitting operation control information."

The first optical supervisory channel is a channel outside of the transmission band for main optical signals, or as taught by Barry (col. 4, lines 62-66) an "out-of-band" supervisory channel. Although the Examiner contends the features recited by claim 3 are taught by Barry in rejecting claim 3, Applicants submit that Barry does not teach, in the lines cited or anywhere else, and Ogawa does not teach, use of an "out-of-band" supervisory channel "for indicating said setting information between WDM devices and using at least one of said first optical supervisory channel and said second optical supervisory channel for transmitting operation control information."

CONCLUSION

Since none of the cited art, alone or in combination, teach the features recited in independent claim 1 (and claims 2-5 dependent thereon) and *prima facie* obviousness is not established, the rejection should be withdrawn and claims 1-5 allowed.

TRAVERSE OF REJECTION OF INDEPENDENT CLAIM 6

Independent claim 6, as amended, recites a WDM device "variable setting including selection of an idle-band wavelength for use as said second supervisory channel according to wavelength information provided from an external source."

The Action concedes, in discussion of the above feature, that neither Barry, Ogawa,

or the combination of the two teaches:

that the setting information indicating means uses one of wavelength information, section information, or time information as the setting information for setting the second supervisory control channel. . . . the setting information (of Ogawa) has no effect on the wavelength of the supervisory signal. Furthermore,. . . (Barry teaches) away from adjusting the wavelength of the supervisory signal as claimed." (Emphasis added).

(Action at pages 6-7).

That is, the Action concedes that the cited art, does not teach or suggest, alone or in combination features recited in independent claim 6, as amended.

CONCLUSION

Since none of the cited art, alone or in combination, teach the features recited in independent claim 6 and *prima facie* obviousness is not established, the rejection should be withdrawn and claim 6 allowed.

TRAVERSE OF REJECTION OF INDEPENDENT CLAIM 7

Independent claim 7 recites a network managing device for managing a network, including "second supervisory channel whose transmission band falls in an idle band in the transmission band for said main optical signals, the setting information including wavelength information that specifies which idle-band wavelength said WDM device should select for use as said second optical supervisory channel."

Independent claim 6, as amended, recites a WDM device "variable setting including selection of an idle-band wavelength for use as said second supervisory channel according to wavelength information provided from an external source."

The Action concedes, in discussion of the above feature, that neither Barry, Ogawa, or the combination of the two teaches:

that the setting information indicating means uses one of wavelength information, section information, or time information as the setting information for setting the second supervisory control channel. . . . the setting information (of Ogawa) has no effect on the wavelength of the supervisory signal. Furthermore,. . . (Barry teaches) away from adjusting the wavelength of the supervisory signal as claimed." (Emphasis added).

(Action at pages 6-7).

That is, the Action concedes that the cited art, does not teach or suggest, alone or in combination features recited in independent claim 6, as amended.

CONCLUSION

Since none of the cited art, alone or in combination, teach the features recited in independent claim 7, and *prima facie* obviousness is not established, the rejection should be

withdrawn and claim 7 allowed.

NEW CLAIMS

New claims 8-11 present no new matter and are provided to afford a varying scope of protection.

New claims 8-9 recite a communication system for performing optical communications including "setting information including wavelength information that specifies which idle-band wavelength to select for use as the second optical supervisory channel at the supervisory control channel setting means."

New claims 10-11 recite a method of optical communications including "variably setting the supervisory control channels and selecting an idle-band wavelength for the second supervisory channel; wavelength-multiplexing and -demultiplexing the supervisory control channels and the main optical signals; (and) indicating setting information setting the supervisory control channels and specifying which idle-band wavelength to select as the second optical supervisory channel."

These, and other, features of claims 8-11 are patentably distinguishable from the cited art, and they are submitted to be allowable for the recitations therein.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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